V. NON-OCCURRENCE OF CHRONIC PULMONARY DISEASE IN SMOKERS

The morbidity statistics are derived from the analysis of a questionnaire on the occurrence of respiratory symptoms or from examination of individuals who undergo a simple test of ventilatory function. All these surveys show a high incidence of respiratory symptoms and subnormal ventilatory function in smokers as compared with nonsmokers. This is one basis for concluding that cigarette smoking is one of the important causes of chronic obstructive pulmonary disease, also referred to in the preceding section as the pulmonary emphysema-chronic bronchitis complex.

It should be emphasized that the prevalence of respiratory symptoms among smokers ranges from 10 to 40% in various surveys, and that 60 to 90% of smokers do not complain of coughing, expectoration or shortness of breath. Those that do complain do not necessarily suffer from chronic bronchitis or pulmonary emphysema because these symptoms are also characteristic of other chronic pulmonary diseases, such as bronchial asthma, pulmonary tuberculosis and other specific forms of infection of the lung. In the absence of such diseases, the symptoms may originate from exposure to industrial hazards. Inhalation of dust particles and of pollutants has been ignored in attempts to relate cigarette smoking to respiratory symptoms. The following bibliographic lists are appended containing articles relating to morbidity studies and industrial hazards in general:

No. 11. Morbidity studies.

No. 12. Industrial hazards.

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V-A. SPECIFIC FORMS OF PULMONARY DISEASE

Pulmonary emphysema and chronic bronchitis as separate diseases are discussed in Sections II and III respectively. The other forms of chronic pulmonary disease which have been investigated in smokers are discussed in this section. The monograph by Mork (1962), dealing with a comparative study of respiratory disease in England, Wales and Norway, summarizes the literature on the role of smoking in causing chronic pulmonary disease.

1. Pulmonary tuberculosis. In England, mortality from pulmonary tuberculosis in middle and later life is higher for males than for females. Lowe (1956) noted a higher proportion of smokers among tuberculous patients than among nontuberculous controls and concluded that smoking is an important cause of the breakdown of healed or quiescent respiratory tuberculosis in adults. Confirmation of the association has been reported by Edwards (1957) in England, by Shah et al. (1959) and Viswanathan et al. (1965) in India, by Nakajima (1966) in Japan, by Lawther (1966) in the Netherlands, by Adelstein and Rimington (1967) in England, and by Sussmann (1967) in Germany. Snider et al. (1971) reviewed 4,092 patients discharged from a tuberculosis sanitarium in Chicago and found no correlation between cigarette smoking and chronic airway obstruction. There is a high incidence of emphysema in tuberculous patients but a cause and effect relationship has not been established (Lancaster and Tomashefski, 1963; Katz and Kanofsky, 1964; Geiser and Steinmann, 1969).

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2. Pulmonary fibrosis. This rare disease has been examined for its occurrence among smokers and nonsmokers. Cullen et al. (1965) reported two nonsmokers in a group of 12 patients from New York. Weiss (1967, 1969) listed six nonsmokers in a group of 31 patients from Pennsylvania. Among 100 asbestos textile workers in Pennsylvania six nonsmokers were included among the 35 patients diagnosed as having pulmonary fibrosis (Weiss, 1971). A high incidence of smokers has been reported among patients with pulmonary fibrosis in Guyana (Miller et al., 1968, 1971) and Rumania (Lupu et al., 1966).

3. Bronchial asthma and allergy to tobacco. A few asthmatic patients have been reported in the literature who are allergic to tobacco (Jimenez-Diaz and Cuenza, 1935; Rosen, 1946; Rosen and Levy, 1950; Segal and Dulfano, 1965; Blue, 1970). Skin tests against tobacco extract are usually positive in smokers regardless of whether asthma is present or absent (Pavlik and Cermakova, 1964). The presence of anti-tobacco precipitins has been reported in over half of those who smoke (Aiache et al., 1972). The significance of these observations has not been elucidated. The coexistence of bronchial asthma and pulmonary emphysema has been demonstrated but this does not imply that the former is a cause of the latter (Lowell, 1959; Winkenwerder et al., 1962; Rowe and Rowe, 1965; Horowitz, 1969; Preiser et al., 1969).

4. Other diseases. Spontaneous pneumothorax occurs in smokers. Legrand et al. (1971) postulated that smoking is the cause of the disease, where Zivy (1970), Zivy and Fournier (1970) and Berard and Emonot (1972) discount it. In a survey of 185 patients with pulmonary chickenpox in Australia,

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smoking was a highly significant associated factor (Knyvett, 1967). There is a high incidence of peptic ulcer (about 25%) in patients with pulmonary emphysema. Although a majority of these patients are smokers, it is not possible to state that smoking is the cause of these ulcers (Lowell et al., 1956; Kroeker and Leon, 1962). Other factors, such as vagotonia, hypercapnia, hypoxia and genetic factors should be considered.

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V. NON-OCCURRENCE OF CHRONIC PULMONARY DISEASE IN SMOKERS

A. SPECIFIC FORMS OF PULMONARY DISEASE

Reprint

ADELSTEIN A M and RIMINGTON J: Smoking and pulmonary tuberculosis an analysis based on a study of volunteers for mass miniature radiography. Tubercle 48: 219-226, 1967. 344

AIACHE J M, CHEMINAT J C; LAKATOS M and MOLINA C: Precipitines anti-tabac et affections des voies respiratoires. Rev de Tuberculose et Pneumologie 36: 301-7, 1972. 345

BERARD J and EMONOT A: Enquete sur l'etiologie du pneumothorax spontane dit idiopathique. (Investigation on the etiology of so-called 'idiopathic' spontaneous pneumothorax.) J Med Lyon 1223: 281-90, 1972. 346

BLUE J A: Cigarette asthma and tobacco allergy. Ann Allergy 28: 110-15, 1970. 347

CULLEN J H, KATZ H L and KAEMMERLEN J T: Chronic diffuse pulmonary infiltration and airway obstruction. Am Rev Resp Dis 92: 775-80, 1965. 348

D'ANELLI A, PROSCIA N, SORISIO F, and CARATTI C A: L'enfisema polmonare cronico ostruttivo nel malato ulceroso. Arch Sci Med 125: 191-94, 1968. 349

EDWARDS J H: Contribution of cigarette smoking to respiratory disease. Br J Prev Soc Med 11: 10-21, 1957. 350

GEISER V B and STEINMANN B: Infektionen im alter. Z Gerontologie 2: 69-85, 1969. 351

HOROWITZ L: Chronic obstructive bronchopulmonary disease (emphysema?) in children with asthma. J Asthma Res 6: 211-17, 1969. 352

JIMINEZ-DIAZ C and CUENZE B S: Asthma produced by susceptibility to unusual allergens. J Allergy 6: 397-403, 1935. 353

KATZ J and KUNOFSKY: Tuberculosis as a cause of the increasing mortality from emphysema. Am Rev Resp Dis 89: 673-79, 1964. 354

KNYVETT A F: The relation between tobacco smoking and pulmonary chickenpox. Med J Aust 2: 1197-98, 1967. 355

KROEKER E J and LEON A S: The association of diffuse obstructive pulmonary emphysema and chronic gastroduodenal ulceration. Dis Chest 42: 413-21, 1962. 356

LANCASTER J F and TOMASHEFSKI J F: Tuberculosis -- a cause of emphysema. Am Rev Resp Dis 87: 435-37, 1963. 357

LAWTHER P J. Air pollution and respiratory disease. Ned Tijds Genees 110: 2318-19, 1966. 358

LEGRAND M, BOTTO M J and LESOBRE R: Le pneumothoraz spontane. Recherches etiologiques suggerees par la prevalence masculine de l'affection. (The spontaneous pneumothorax. Etiologic investigation suggested by the prevalence of the disease in the male subjects). Le Poumon et le Coeur 27: 827-43, 1971. 359

10050139?

Source: https://www.industrydocuments.ucsf.edu/docs/rfmk0000

LOWE C R: An association between smoking and respiratory tuberculosis. Br Med J 2: 1081-86, 1956. 360

LOWELL F C: The relationship of allergy to emphysema. Am Rev Resp Dis 80: 181-83, 1959. 361

LOWELL F C, FRANKLIN W, MICHELSON A L, and SCHILLER I W: A note on the association of emphysema, peptic ulcer and smoking. N Engl J Med 254: 123-24, 1956. 362

LUPU D N G, VELICAN C and RACOVEANU C: Fibrosis pulmonar por tabaco. Prensa Med Argent 53: 646-51, 1966. 363

MILLER G J, ASHCROFT M T, BEADNELL H M S G, WAGNER J C and PEPYS J: The lipoid pneumonia of blackfat tobacco smokers in Guyana. Quart J Med 15: 457-70, 1971. 364

MILLER G J, BREADNELL H M S G and ASHCROFT M T: Diffuse pulmonary fibrosis and blackfat-tobacco smoking in Guyana. Lancet 2: 259-60, 1968. 365

MORK T: A comparative study of respiratory disease in England and Wales and Norway. Acta Med Scand 172 (Suppl 384): 1-100, 1962. 366

NAKAJIMA T: A study on chronic bronchitis complicated with pulmonary tuberculous patients. Kekkahu 41: 337-44, 1966. 367

PAVLIK I and CERMAKOVA Z: Casna kozni reakce na tabakovy extrakt u chorob dychadel. (Early skin reactions against tobacco extract in respiratory system disease). Rozhledy Tuberk Nem Plicnik 24: 629-35, 1964. 368

PREISER F M, DONNER M W and VAN METRE T E Jr: Comparison of midplane, full-chest tomograms, duffusing capacities, sputum eosinophil content, and other parameters in patients with asthma and emphysema. J Allergy 44: 154-64, 1969. 369

ROSEN F L: Bronchial asthma in the young male adult. Ann Allergy 4: 247-60, 1946. 370

ROSEN F L and LEVY A: Bronchial asthma due to allergy to tobacco smoke in an infant. JAMA 144: 620-21, 1950. 371

ROWE A H and ROWE A Jr: Food allergy -- its role in emphysema and chronic bronchitis. Dis Chest 48: 609-12, 1965. 372

SEGAL M S and DULFANO M J: Glomectomy in the treatment of chronic bronchial asthma. N Engl J Med 272: 57-63, 1965. 373

SHAH J R, WARAWADEKAR M S, DESHMUKH P A and PHUTANE P N: Institutional survey of pulmonary tuberculosis with special reference to smoking habits. Indian J Med Sci 13: 381-92, 1959. 374

SNIDER G L, DOCTOR L, DEMAS T A and SHAW A E: Obstructive airway disease in patients with treated pulmonary tuberculosis. Am Rev Resp Dis 103: 625-40, 1971. 375

SUSSMANN F H A: Die chronischen unspezifischen lungenerkrankungen aus der sicht des kreistuberkulosearztes. Z Tuberk 127: 191-202, 1967. 376

100505139

Source: https://www.industrydocuments.ucsf.edu/docs/nmk0000

VISWANATHAN R, MODY R K, PRASAD S S and SINHA S P: Bronchial asthma and chronic bronchitis. J Indian Med Assoc 45: 480-83, 1965. 377

WEISS W: Cigarette smoking and diffuse pulmonary fibrosis. Arch Environ Health 14: 564-68, 1967. 378

WEISS W: Cigarette smoking and diffuse pulmonary fibrosis. Am Rev Resp Dis 99: 67-72, 1969. 379

WEISS W: Cigarette smoking, asbestos, and pulmonary fibrosis. Am Rev Resp Dis 104: 223-27, 1971. 380

WINKENWERDER W L, ALLAN W B and FISHER A M: A consideration of the etiology of obstructive emphysema, with especial emphasis on the role of allergy. Trans Am Clin Climatol Assoc 74: 1-14, 1962. 381

ZIVY P: Le pneumothorax spontane des fumeurs. Le poumon tabagique. Rev Tuberc Pneumol 34: 125-58, 1970. 382

ZIVY P and FOURNIER E: Tabagisme, emphyseme bulleux et pneumothorax spontane (P. S. I.) idiopathique. Ann Med Intern 121: 1049-56, 1970. 383

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V-B. MORBIDITY STATISTICS IN THE UNITED STATES

The prevalence of respiratory symptoms among cigarette smokers has been investigated in several states. Some of the surveys consider the additional role of industrial hazards and of air pollution in the causation of symptoms which suggest the presence of chronic pulmonary disease.

1. New Hampshire. In 1961, a study of prevalence of respiratory disease among 1,261 residents of Berlin, New Hampshire, was carried out (Ferris and Anderson, 1965; Anderson and Ferris, 1962; Anderson et al., 1963). It was observed that in cigarette smokers, chronic respiratory disease was substantially more prevalent than in nonsmokers of similar age and sex. A repeat study of the group in 1967 showed a lower prevalence of such disease than in 1961. The levels of air pollution were less in the second study than in the first, and it was suggested that this fall accounted for the decrease in prevalence of the disease and improvement in lung function (Ferris et al., 1971). Eckardt (1972) and Ferris et al., (1973) have exchanged correspondence with each other on the results that pulmonary function is better in males smoking 45 cigarettes /day than in those who smoke 1 to 4 cigarettes.

The above studies emphasize the shortcomings of morbidity statistics which attempt to correlate cigarette smoking with incidence of respiratory disease. If cigarette smoking is indeed an important cause of lung disease, continued smoking from 1961 to 1967 would have increased its incidence, but this did not occur. The effects of the reduction in air pollution appear to show that atmospheric impurity is a more important

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cause of lung disease than cigarette smoking. A group of 147 men drawn from workers in a pulp mill was compared with one of 124 men from a paper mill. Although the pulp mill workers were exposed to chlorine and sulfur dioxide, there was no significant difference between the two groups in regard to respiratory symptoms and ventilatory function. The working population of both mills together showed a lower prevalence of respiratory disease than did the male population of Berlin, N. H., suggesting that the working population may not be representative of the general population (Ferris et al., 1967).

2. Massachusetts. A sample of the population of Framingham has been examined periodically for symptoms of lung disease, chest x-ray and ventilatory function (Revotskie et al., 1962). The results do not show any correlation between smoking and incidence of symptoms or reduction in ventilatory function. The following groups were found to show a higher incidence of respiratory symptoms among smokers than nonsmokers: 5,000 registrants for military service (Andosca, 1966); 100 college seniors and (Peters and Ferris, 1967); 2,027 university graduates (Peters and Ferris, 1967). In the second group there was no statistically significant difference in vital capacity and forced expiratory volume between smokers and nonsmokers. In the third group, the higher incidence of respiratory symptoms in addition was accompanied by traumatic and genitourinary problems. The authors do not attribute the high incidence of trauma and genitourinary problems among smokers to cigarette smoking, yet they

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ascribe the respiratory symptoms to it.

Two groups of workers were surveyed in Massachusetts. Ferris et al. (1968) examined movie projectionists and noted no difference in ventilatory function between smokers and nonsmokers.

3. Connecticut. A group of 424 persons residing in Southern Connecticut were questioned for incidence of respiratory symptoms (Kelsey et al., 1968). Smokers were affected more frequently than nonsmokers. However, a statistically significant association was observed between severity of symptoms and migration from urban areas. The chronic bronchitics with severe symptoms were most likely to have left urban areas afflicted with air pollution in recent years.

A retrospective study was made of medical absenteeism among 226 male employees of a manufacturing company from 1956 through 1964 (Holcomb and Meigs, 1972). There was a significant association of high absenteeism with cigarette smoking and a more significant association of low absenteeism with cigar or pipe smoking. The authors proposed a hypothesis that adoption of the habit of cigar or pipe smoking at middle age occurred among men with constitutional and absentee behavioral characteristics tending to distinguish them from men with a lifelong cigarette smoking habit. The authors suggested caution in drawing causal conclusions regarding these associations because of considerable overlapping of individual absentee rates among groups divided by smoking habits.

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4. New York. The following groups solicited by a questionnaire show a higher incidence of respiratory symptoms among smokers than among nonsmokers: 2,031 insurance policy holders (Short et al., 1939); 1,250 telephone men over 40 years of age (Holland and Stone, 1965; Comstock et al., 1970); and 12,604 postal and transit workers (Densen et al., 1967). In the last-mentioned study, there was a decrease of forced expiratory volume with age, particularly among white men more than among nonwhite men (Densen et al., 1964, 1967). A similar racial difference was encountered in a survey of 6,314 workers for pulmonary emphysema (Robins et al., 1969).

Two surveys were made of industrial workers. A group of 55 grain handlers in Western New York State (Kleinfeld et al., 1968). There was no significant difference in vital capacity between smokers and nonsmokers up to 19 years of age but a significant difference in vital capacity and forced expiratory volume between these two types of subject when 20 years old or more. A group of 1,744 individuals exposed to oil mist showed a higher incidence of respiratory symptoms for smokers than for nonsmokers (Ely et al., 1970).

5. Pennsylvania. Boucot et al. (1962) reported that among 6,137 males over 45 years of age there was a higher incidence of chronic cough among smokers than among nonsmokers. A similarity in cough pattern appeared in cigarette, cigar and pipe smokers,

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suggesting that tobacco smoke in general rather than cigarette smoke alone causes cough.

The other reports from Pennsylvania concern coal miners. In a group of 801 anthracite coal miners, smoking, aging and duration of exposure to coal dust increased the prevalence of pneumoconiosis (Tokuhata et al., 1970). Autopsies performed on a group of 144 Appalachian underground coal workers indicated no significant effect of smoking on lung structure in anthracite miners (Naeye et al., 1971). Among bituminous coal miners, the smokers had a greater degree of cor pulmonale and more emphysema and bronchiolar goblet cells. The authors suggested that the effect of smoking among anthracite miners may be obscured by the severe lesions primarily related to the pneumoconiosis. Another possibility is that above-ground forms of air pollution may partially obscure the influence of smoking. In response to a communication from Kibelstis (1972), the authors emphasized that it is not yet possible to quantitate the individual contributions to emphysema of mine dust, smoking, other air pollutants, infection and other factors of individual susceptibility.

6. West Virginia. The data collected from 258 bituminous miners show a higher incidence of respiratory symptoms among smokers than among nonsmokers (Hyatt et al., 1964). In another survey of 5,540 persons living in five communities, there was a higher incidence of respiratory symptoms among smokers than among nonsmokers (Higgins et al., 1968). The mean of forced expiratory volume of smokers and that of nonsmokers under 50 years of age were not different but these were lower for smokers and nonsmokers

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over 50 years of age.

That chronic obstructive disease can still occur among miners who are nonsmokers indicates the importance of exposure to coal dust as a causative factor (Rasmussen, 1971; Rasmussen and Nelson, 1971). The reduction in the ventilatory function of coal miners who are smokers is particularly marked after the end of the working period (Lapp et al., 1972). The prevalence of respiratory symptoms in a mining community is the same both for miners and for nonminers, so that the contamination of the air influences the incidence of lung disease (Enterline and Lainhart, 1967).

7. Maryland. Stebbings (1971 a, b, c, d) has reported the results of examination of 736 white males, 35 to 64 years old, who were nonsmokers. Although the investigation did not include smokers, several problems relating to statistics became apparent. The prevalence of respiratory symptoms or illness as derived from the standard questionnaire does not discriminate adequately between upper respiratory allergic conditions, lower respiratory symptoms and cardiovascular symptoms. The pulmonary function values included sizable instrument and interviewer data that were statistically significant. Social class can influence respiratory symptoms and pulmonary function. Furthermore, the effect of duration of urban residence on pulmonary function vary. Most of the shortcomings uncovered by Stebbings were overlooked in prevalence studies reported by the United States Public Health Service.

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8. Southern States. The incidence of respiratory symptoms among smokers is higher than among nonsmokers in the foll owing groups: 1, 848 military cadets in Georgia (Finklea et al., 1971), and 408 cotton textile workers in North Carolina (Merchant et al., 1972) and in Georgia (Bouhuys et al., 1969). In Tennessee, the extent of air pollution has been shown to influence the incidence of respiratory symptoms (Zeidberg et al., 1964).

9. Michigan. In 1958 a group of 1, 317 men, ranging in age from 40 to 65 years, with industrial exposure in the Detroit area, were examined (Brinkman and Coates, 1962). Cigarette smoking was identified as the most important factor in the etiology of chronic bronchitis diagnosed by the occurrence of expectoration daily for at least six months. After a six-year period, the subjects diagnosed as chronic bronchitics did not show any adverse effect on health, working ability or ventilation even though they continued smoking (Brinkman and Block, 1966, 1972).

Additional surveys have appeared relating to the following: 6,500 residents of Tecumseh (Payne and Kjelsberg, 1964; Higgins and Kjelsberg, 1967); 1,584 Detroit postal employees 40 years of age or older (Coates et al., 1965); and 1, 058 iron foundry workers (Clarke, 1972). A higher incidence of respiratory symptoms among smokers than among nonsmokers was reported.

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10. Minnesota. In a group of 450 railroad employees, there was a correlation between intensity of smoking and the expiratory volumes and incidence of symptoms (Blackburn et al., 1965). In subjects who stopped smoking, the ventilatory function was elevated to "supernormal" level. The authors have interpreted this as strengthening the concept that smokers differ from nonsmokers in characteristics other than the smoking habit.

11. Midwestern states. The following surveys have revealed a higher incidence of respiratory symptoms among smokers than among nonsmokers: 1,887 white males 43 to 58 years old employed in an industrial plant in Illinois (Sharp et al., 1965); 136 white-collar workers 35 to 64 years of age in Ohio (Krumholz and Hedrick, 1973); 557 high school students in Oklahoma.(Addington et al, 1970).

12. Colorado. In a group of 172 adult men and women over 40 years of age, ventilatory function in male nonsmokers was significantly better than in smokers, but there was no significant difference between female nonsmokers and smokers (Bower, 1961). In a prevalence study of 633 residents of Glenwood Springs, a strong association was found to exist between incidence of chronic bronchitis and cigarette smoking (Mueller et al., 1971 a, b). The authors reviewed interstudy variations in the prevalence of respiratory disease in various geographic areas and concluded that there are other factors which determine the incidence of chronic

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obstructive pulmonary disease. In a group of 1,500 uranium miners, cigarette smoking did not influence the occurrence of shortness of breath or persistent coughing (Archer et al., 1964). The hazards of radiation exposure are more severe than other factors, such as aging, altitude and cigarette smoking.

12. California. The following surveys indicate a higher incidence of respiratory symptoms among smokers than among nonsmokers: 7,070 industrial workers in Los Angeles County (Balchum et al., 1962); 3,311 longshoremen in San Francisco bay area (Goldsmith et al., 1962); and 630 telephone workers in San Francisco and Los Angeles (Deane et al., 1965). In a group of 38 beryllium workers, ventilatory function was measured at 6-month intervals for 18 to 24 months. The day-to-day variation in values was greater for smokers than for nonsmokers (Dawson, 1966).

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BIBLIOGRAPHY

V. NON-OCCURRENCE OF CHRONIC PULMONARY DISEASE IN SMOKERS

B. MORBIDITY STATISTICS IN THE UNITED STATES

Reprint

ADDINGTON W W, CARPENTER R L, DUNCAN K A and MOGG K: The Association of Cigarette Smoking With Respiratory Symptoms and Pulmonary Function in a Group of High School Students. Oklahoma Med Ass J 63: 525-29, 1970. 384

ANDERSON D O and FERRIS B G Jr: Role of Tobacco Smoking in the Causation of Chronic Respiratory Disease. N Engl J Med 267: 787-94, 1962. 385

ANDERSON D O, ZICKMANTEL R and FERRIS B G Jr: Response to a Respiratory Survey. Canad Med Ass J 88: 596-602, 1963. 386

ANDOSCA J B: The Incidence of Smoking and the Smoking Habits in 5000 Registrants for Military Service. J Am Geriatr Soc 14: 631-32, 1966. 387

ARCHER V E, CARROL B E, BRINTON H P, and SACCOMANNO G: Epidemiological Studies of some Non-fatal Effects of Uranium Mining. In: Radiological Health and Safety in Mining and Milling of Nuclear Materials, Vol I, International Atomic Energy Agency: Vienna 21-36, 1964. 388

BALCHUM O J, FELTON J S, JAMISON J N, GAINES R S, CLARKE D R and OWAN T: A Survey for Chronic Respiratory Disease in an Industrial City. Am Rev Resp Dis 86: 675-85, 1962. 389

BLACKBURN H, TAYLOR H L, PARLIN R W, KIHLBERG J and KEYS A: Physical Activity of Occupation and Cigarette Smoking. Arch Environ Health 10: 312-22, 1965. 390

BOUCOT K R, COOPER D A and WEISS W: Smoking and the Health of Older Men. Arch Environ Health 4: 59-72, 1962. 391

BOUHUYS A, WOLFSON R L, HORNER D W, BRAIN J D and ZUSKIN E: Byssinosis in Cotton Textile Workers. Respiratory Survey of a Mill with Rapid Labor Turnover. Ann Intern Med 71: 257-69, 1969. 392

BOWER G: Respiratory Symptoms and Ventilatory Function in 172 Adults Employed in a Bank. Am Rev Resp Dis 83: 684-89, 1961. 393

BRINKMAN G L and BLOCK D L: The Prognosis in Chronic Bronchitis. JAMA 197: 71-77, 1966. 394

BRINKMAN G L and BLOCK D L: Chronic bronchitis in a Working Population. J Occup Med 14: 825-27, 1972. 395

BRINKMAN G L and COATES E O: The Prevalence of Chronic Bronchitis in an Industrial Population. Am Rev Resp Dis 86: 47-54, 1962. 396

CLARKE N E Sr.: Silicosis and Diseases of Retired Iron Foundry Workers. Ind Med 41: 22-25, 1972. 397

COATES E O Jr, BOWER G C and Reinstein N: Chronic Respiratory Disease in Postal Employees. JAMA 191: 161-66, 1965. 398

10050514 09

Source: https://www.industrydocuments.ucsf.edu/docs/nmk0000

COMSTOCK G W, BROWNLOW W J, STONE R W and SARTWELL P E: Cigarette Smoking and Changes in Respiratory Findings. Arch Environ Health 21: 50-59, 1970. 399

DAWSON A: Reproducibility of Spirometric Measurements in Normal Subjects. Am Rev Resp Dis 93: 264-268, 1966. 400

DEANE M, GOLDSMITH J R and TUMA D: Respiratory Conditions in Outside Workers. Arch Environ Health 10: 323-331, 1965. 401

DENSEN P M, JONES E W, BASS H E and BREUER J: A Survey of Respiratory Disease Among New York City Postal and Transit Workers. Environ Res 1: 262-86, 1967. 402

DENSEN P M, JONES E W, BASS H E, BREUER J and REED E: A Survey of Respiratory Disease Among New York City Postal and Transit Workers. Environ Res 2: 277-96, 1964. 403

ECKARDT R E: Chronic Nonspecific Respiratory Disease, Berlin, New Hampshire 1961-1967: A Cross Section Study. Am Rev Resp Dis 105: 854, 1972. 404

ELY T S, PEDLEY S F, HEARNE F T and STILLE W T: A study of mortality, symptoms, and respiratory function in humans occupationally exposed to oil mist. J Occup Med 12: 253-61, 1970. 405

ENTERLINE P E and LAINHART W S: The relationship between coal mining and chronic nonspecific respiratory disease. Am J Public Health 57: 484-95, 1967. 406

FERRIS B G and ANDERSON D O: The prevalence of chronic respiratory disease in a New Hampshire town. Am Rev Resp Dis 86: 165-77, 1965. 407

FERRIS B G Jr, BURGESS W A and WORCESTER J: Prevalence of chronic respiratory disease in a pulp mill and a paper mill in the United States. Br J Ind Med 24: 26-37, 1967. 408

FERRIS B G Jr, BURGESS W A and WORCESTER: Chronic nonspecific respiratory disease in a movie projectionists union. Arch Environ Health 16: 886-91, 1968. 409

FERRIS B G Jr, HIGGINS I T T, HIGGINS M W, PETERS J M, VAN GANSE W F and GOLDMAN M D: Chronic nonspecific respiratory disease, Berlin, New Hampshire, 1961-1967: A cross-sectional study. Am Rev Resp Dis 104: 232-44, 1971. 410

FERRIS B G Jr, HIGGINS I T T, HIGGINS M W and PETERS J M: Chronic nonspecific respiratory disease in Berlin, New Hampshire, 1961 to 1967. A follow-up study. Am Rev Resp Dis 107: 110-22, 1973. 411

FINKLEA J F, HASSELBLAD V, SANDIFER S H, HAMMER D I and LOWRIMORE G R: Cigarette smoking and acute non-influenzal respiratory disease in military cadets. Am J Epidemiol 93: 457-62, 1971. 412

GOLDSMITH J R, HECHTER H H, PERKINS N M and BORHANI N O: Pulmonary function and respiratory findings among longshoremen. Am Rev Resp Dis 86: 867-74, 1962. 413

HIGGINS I T T, HIGGINS M W, LOCKSHIN M D and CANALE N: Chronic respiratory disease in mining communities in Marion County, West Virginia. Br J Ind Med 25: 165-75, 1968. 414

100505410

Source: https://www.industrydocuments.ucsf.edu/docs/ffmk0000

HIGGINS M W and KJELSBERG M: Characteristics of smokers and nonsmokers in Tecumseh, Michigan. Am J Epidemiol, 86: 60-77, 1967. 415

HOLCOMB III H S, and MEIGS J W: Medical absenteeism among cigarette, and cigar and pipe smokers. Arch Environ Health 25: 295-300, 1972. 416

HOLLAND W W and STONE R W: Respiratory disorders in United States east coast telephone men. Am J Epidemiol 82: 92-101, 1965. 417

HYATT R E, KISTIN A D and MAHAN T K: Respiratory disease in southern West Virginia coal miners. Am Rev Resp Dis 89: 387-401, 1964. 418

KELSEY J L, MOOD E W and ACHESON R M: Population mobility and epidemiology of chronic bronchitis in Connecticut. Arch Environ Health 16: 853-61, 1968. 419

KIBELSTIS J A: Coal workers' pneumoconiosis. JAMA 221: 301-02, 1972. 420

KLEINFELD M, MESSITE J, SWENCICKI R E and SHAPIRO J: A clinical and physiologic study of grain handlers. Indust Hyg Rev 10: 12-19, 1968. 421

KRUMHOLZ R A and HENDRICK E C: Pulmonary function differences in normal smoking and nonsmoking, middleaged, white-collar workers. Am Rev Resp Dis 107: 225-30, 1973. 422

LAPP N L, HANKINSON J L, BURGESS D B and O'BRIEN R: Changes in ventilatory function in coal-miners after a work shift. Arch Environ Health 24: 204-8, 1972. 423

MERCHANT J A, KILBURN K H, O'FALLON W M, HAMILTON J D and LUMSDEN J C: Byssinosis and chronic bronchitis among cotton textile workers. Ann Intern Med 76: 423-33, 1972. 424

MUELLER R E, KEBLE D L, PLUMMER J and WALKER S H: The prevalence of chronic airway obstruction, and respiratory symptoms in a Colorado city. Am Rev Resp Dis 103: 209-28, 1971A. 425

MUELLER R E, WALKER S H and PLUMMER J: An epidemiologic study of chronic bronchitis, chronic airway obstruction and respiratory symptoms in a Colorado city. Hartford Hosp Bull 26: 261-97, 1971B. 426

NAEYE R L: Coal workers' pneumoconiosis. J Am Med Ass 222: 87, 1972. 427

NAEYE R L, MAHON J K and DELLINGER W S: Effects of smoking on lung structure of Appalachian coal workers. Arch Environ Health 22: 190-93, 1971. 428

PAYNE M and KJELSBERG M: Respiratory symptoms, lung function, and smoking habits in an adult population. Am J Public Health 54: 265-77, 1964. 429

PETERS J M and FERRIS B G Jr: Smoking, pulmonary function, and respiratory symptoms in a college-age group. Am Rev Resp Dis 95: 774-82, 1967. 430

PETERS J M and FERRIS B G Jr: Smoking and morbidity in a college-age group. Am Rev Resp Dis 95: 783-89, 1967. 431

RASMUSSEN D L: Impairment of oxygen transfer in dyspneic, nonsmoking soft coal miners. J Occup Med 13: 300-5, 1971. 432

RASMUSSEN D L and NELSON C W: Respiratory function in southern Appalachian coal miners. Am Rev Resp Dis 103: 240-48, 1971. 433

10050511

Source: https://www.industrydocuments.ucsf.edu/docs/nmk0000

REVOTSKIE N, KANNELL W, GOLDSMITH J R and DAWBER T R: Pulmonary function in a community sample. Am Rev Resp Dis 86: 907-11, 1962. 434

ROBINS A B, EPSTEIN H H, DIAMOND P H, PLISHNER M J and FINKELSTEIN H: A project for the prevention of disability from chronic respiratory disease in working males. Am J Public Health 59: 77-85, 1969. 435

SHARP J T, PAUL O, LEPPER M H, McKEAN H, and SAXTON G A Jr: Prevalence of chronic bronchitis in an American male urban industrial population. Am Rev Resp Dis 91: 510-19, 1965. 436

SHORT J J, JOHNSON H J, and LEY H A Jr: The effects of tobacco smoking on health. J Lab Clin Med 24: 586-89, 1939. 437

STEBBINGS JH Jr: Chronic respiratory disease among nonsmokers in Hagerstown, Maryland. Design of the study and prevalence of symptoms. Environ Res 4: 146-62, 1971A. 438

STEBBINGS J H Jr: Chronic respiratory disease among nonsmokers in Hagerstown Maryland. Problems in the estimation of pulmonary function values in epidemiological surveys. Environ Res 4: 163-92, 1971B. 439

STEBBINGS J H Jr: Chronic respiratory disease among nonsmokers in Hagerstown, Maryland. Social class and chronic respiratory disease. Environ Res 4: 213-32, 1971C. 440

STEBBINGS J H Jr: Chronic respiratory disease among nonsmokers in Hagerstown, Maryland. Effects of urban residence on pulmonary function values. Environ Res 4: 283-304, 1971D. 441

TOKUHATA G K, DESSAUER P, PENDERGRASS E P, HARTMAN T, DIGON E, and MILLER W: Pneumoconiosis among anthracite coal miners in Pennsylvania. Am J Public Health 60: 441-51, 1970. 442

ZEIDBERG L D, PRINDLE R A and LANDAU E: The Nashville air pollution study. III: Morbidity in relation to air pollution. Am J Public Health 54: 85-97, 1964. 443

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V-C. MORBIDITY STATISTICS IN GREAT BRITAIN

Chronic bronchitis is the more common form of chronic obstructive pulmonary disease in Great Britain. Fletcher (1963) and Reid et al. (1964) noted that there was little difference in the prevalence of productive cough between the United States (Berlin, New Hampshire) and all surveyed areas of Great Britain. However, the symptoms of more advanced bronchitis with infection and dyspnea were more prevalent in British areas than in the United States. Holland et al. (1965) arrived at a similar conclusion in comparing the prevalence of symptoms of advanced bronchitis in London and three American cities: Westchester (New York), Baltimore and Washington. The prevalence rates for respiratory symptoms in British male migrants are no greater than for those in native-born Americans, so that the environment is more important than country of birth (Reid et al., 1966). An Anglo-Danish comparison has revealed a higher incidence of respiratory symptoms in England than in Denmark (Olsen and Gilson, 1960).

1. Influence of air pollution. Most of the early comparisons of prevalence rates of respiratory symptoms in Great Britain involved only a single community: 1,300 subjects in London (Oswald et al., 1953); 6,245 clerical workers also in London (Oswald et al., 1955); 631 residents of an agricultural community near Penarth (Higgins et al., 1956; Higgins, 1957); 147 young soldiers at Aldershot (Liebeschuetz, 1959); 2,081 men

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over 60 years of age in Birmingham (Edwards et al., 1959), and 92 general practitioners (College of General Practitioners, 1961). These surveys showed that there is a higher incidence of respiratory symptoms among smokers than nonsmokers.

Subsequent observations have emphasized the importance of air pollution in influencing the prevalence of respiratory symptoms. Higgins and Cochrane (1958) and Higgins (1959) noted a difference in incidence between a community (Annandale) in Scotland and the Vale of Glamorgan in Wales, i. e., between an urban and a rural community. The extent of influence of cigarette smoking was determined by the amount of air pollution.

The urban factor in chronic bronchitis has been studied by Holland and Reid (1965), who surveyed 293 drivers and vehicle maintenance men in central London and 477 men in three rural areas in Southern England. Although personal smoking habits were shown to be closely related to the frequency of respiratory disturbance, the local levels of air pollution appeared to be the most likely cause of the difference in morbidity between urban and rural areas. A study of 2,342 families revealed a relationship between the prevalence of cough and environmental factors. In the fathers who were exposed to the hazards both of home and of occupation, smoking and social class influenced the prevalence of cough. It was not possible to specify the role of smoking alone in incidence of coughing (Colley and Holland,

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1967). Other additional surveys illustrate the importance of air pollution and of social class in influencing the incidence of symptoms of chronic bronchitis: Evans et al. (1969) at Derbyshire; Rimington (1969) at Cheshire; Howard (1970) at Sheffield; and Milne and Williamson (1972 a, b) at Edinburgh. A postal survey of 9,975 men and women in the London area, made with a questionnaire similar to that used in American surveys, revealed a difference between rural and urban areas in the incidence of respiratory symptoms (Lambert and Reid, 1970).

2. Incidence in children and young adults. Approximately 10,000 children in secondary and grammar schools completed a questionnaire relating to their smoking habits (Holland and Elliot, 1968). . . . The frequency of respiratory symptoms was higher among students who smoked more than five cigarettes a day -- about 30% coughing and 20% expectoration -- as compared with 2% and 5% among those smoking less than one cigarette a day. Holland et al. (1969 a, b, c) have summarized the analysis of their results and concluded that environmental and personal factors are important in the onset of chronic respiratory disease. Colley and Reid (1970) surveyed 10,000 children from 6 to 10 years old and noted a pronounced social class gradient in the frequency of chronic cough. The occurrence of respiratory symptoms in children is influenced by the smoking habits of the families (Norman-Taylor and Dickinson, 1972).

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3. Industrial hazards. In 1957 the British Medical Research Council's Pneumoconiosis Research Unit carried out a survey in Staveley, an industrial town (Higgins et al., 1959). The prevalence of respiratory symptoms was higher and ventilatory function was lower in miners exminers and men exposed to chemical fumes than in men who had worked in nondusty jobs. After five and nine years, the follow-up study showed that the annual decline of forced expiratory volume was greater in smokers than in nonsmokers or ex-smokers (Higgins and Oldham, 1962; Higgins et al., 1968, 1969). It was concluded that smoking is a more important factor in the development of respiratory disability than occupation.

Other investigators surveying miners have not identified smoking as a more important factor than industrial hazards in the causation of respiratory symptoms (Ashford et al., 1961; Caplan et al., 1966; Ashford et al., 1970; Ryder et al., 1970; Walker et al., 1971; Lyons et al., 1972).

Among the following industrial workers, smoking contributes to the prevalence of respiratory symptoms: alkaline dust workers (Chivers, 1959), flax workers (Elwood et al., 1965), spinners (Molyneux and Tombleson, 1970), asbestos workers (Regan et al., 1971; Muldoon and Warwick ., 1972) and steel foundrymen (Lowe et al., 1970, 1972; McCallum, 1972). In the last-mentioned type of workmen, the influence of air pollution in the prevalence of respiratory symptoms has been suggested by Lowe et al. (1968).

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V. NON-OCCURRENCE OF CHRONIC PULMONARY DISEASE IN SMOKERS

C. MORBIDITY STATISTICS IN GREAT BRITAIN

Reprint

ASHFORD J R, BROWN S, DUFFIELD D P, SMITH C S and FAY J W J: The relation between smoking habits and physique, respiratory symptoms, ventilatory function, and radiological pneumoconiosis amongst coal workers at three Scottish collieries. Br J Prev Soc Med 15: 106-17, 1961. 444

ASHFORD J R, MORGAN D C, RAE S and SOWDEN R R: Respiratory symptoms in British coal miners. Am Rev Resp Dis 102: 370-81, 1970. 445

CAPLAN A, SIMON G and REID L: The radiological diagnosis of widespread emphysema and categories of simple pneumoconiosis. Clin Radiol 17: 68-70, 1966. 446

CHIVERS C P: Respiratory function and disease among workers in alkaline dusts. Br J Ind Med 16: 51-60, 1959. 447

COLLEGE OF GENERAL PRACTITIONERS: Chronic bronchitis in Great Britain. Br Med J 2: 973-79, 1961. 448

COLLEY J R T and HOLLAND W W: Social and environmental factors in respiratory disease. Arch Environ Health 14: 157-61, 1967. 449

COLLEY J R T and REID D D: Urban and social origins of childhood bronchitis in England and Wales. Br Med J 2: 213-17, 1970. 450

EDWARDS F, McKEOWN T and WHITFIELD A G W: Association between smoking and disease in men over sixty. Lancet 1: 196-200, 1959. 451

ELWOOD P C, PEMBERTON J, MERRETT J D, CAREY G C R and McAULAY I R: Byssinosis and other respiratory symptoms in flax workers in Northern Ireland. Br J Ind Med 22: 27-37, 1965. 452

EVANS S M, WILKES E, and DALRYMPLE-SMITH D: Presymptomatic diagnosis. J Roy Coll Gen Practitioners 17: 237-46, 1969. 453

FLETCHER C M: An account of chronic bronchitis in Great Britain with a comparison between British and American experience of the disease. Dis Chest 44: 1-10, 1963. 454

HIGGINS I T T: Respiratory symptoms, bronchitis, and ventilatory capacity in random sample of an agricultural population. Br Med J 2: 1198-1203, 1957. 455

HIGGINS I T T: Tobacco smoking, respiratory symptoms, and ventilatory capacity. Studies in random samples of the population. Br Med J 1: 325- 29, 1959. 456

HIGGINS I T T and COCHRAN J B: Respiratory symptoms, bronchitis and disability in a random sample of an agricultural community in Dumfriesshire. Tubercule 39: 296-301, 1958. 457

HIGGINS I T T, COCHRANE A L, GILSON J C and WOOD C H: Population studies of chronic respiratory disease. A comparison of mines, foundryworkers, and others in Staveley, Derbyshire. Br J Ind Med 16: 255-68, 1959. 458

10050417

Source: https://www.industrydocuments.ucsf.edu/docs/rfmk0000

HIGGINS I T T, GILSON J C, FERRIS B G Jr, WATERS M E, CAMPBELL H and HIGGINS M W: Chronic respiratory disease in an industrial town: A nine-year follow-up study. Preliminary report. Am J Public Health 58: 1667-76, 1968. 459

HIGGINS I T T, GILSON J C, FERRIS B G, WATERS W E, CAMPBELL H, and HIGGINS M W: Chronic respiratory disease in an industrial town: A nine-year follow-up study. Respiration 26: 221-2, 1969. 460

HIGGINS I T T and OLDHAM P D: Ventilatory capacity in miners. A five-year follow-up study. Br J Ind Med 19: 65-76, 1962. 461

HIGGINS I T T, OLDHAM P D, COCHRANE A L and GILSON J C: Respiratory symptoms and pulmonary disability in an industrial town. Survey of a random sample of the population. Br Med J 2: 904-9, 1956. 462

HOLLAND W W and ELLIOTT A: Cigarette smoking, respiratory symptoms, and anti-smoking propaganda. Lancet 1: 41-43, 1968. 463

HOLLAND W W, HALIL T, BENNETT A E and ELLIOTT A: Factors influencing the onset of chronic respiratory disease. Br Med J 2: 205-8, 1969A. 464

HOLLAND W W, HALIL T, BENNETT A E and ELLIOTT A: Indications for measures to be taken in childhood to prevent chronic respiratory disease. Millbank Mem Fund Quart 47: 215-27, 1969B. 465

HOLLAND W W, HALIL T and ELLIOTT A: The effect of environmental factors on ventilatory function in schoolchildren. Pub Health Serv Pub 1879: 259-72, 1969C. 466

HOLLAND W W and REID D D: The urban factors in chronic bronchitis. Lancet 1: 445-48, 1965. 467

HOLLAND W W, REID D D, SELTSER R and STONE R W: Respiratory disease in England and the United States. Arch Environ Health 10: 338-48, 1965. 468

HOWARD P: A long-term follow-up of respiratory symptoms and ventilatory function in a group of working men. Br J Ind Med 27: 326-333, 1970. 469

LAMBERT P M and REID D D: Smoking, air pollution, and bronchitis in Britain. Lancet 1: 853- 57, 1970. 470

LEIBESCHUETZ H J: Respiratory signs and symptoms in young soldiers and their relationship to smoking. J Royal Army Med Corps 105: 76-81, 1959. 471

LOWE C R, CAMPBELL H, and KHOSLA T: Bronchitis in two integrated steel works. III. Respiratory symptoms and ventilatory capacity related to atmospheric pollution. Br J Ind Med 27: 121-29, 1970. 472

LOWE C R and KHOSLA T: Chronic bronchitis in-ex-coal miners working in the steel industry. Br J Ind Med 29: 45-49, 1972. 473

LOWE C R, PELMEAR P L, CAMPBELL H, HITCHENS R A N, KHOSLA T and KING T C: Bronchitis in two integrated steel works. I.Ventilatory capacity age and physique of non-bronchitic men. Br J Prev Soc Med 22: 1-11, 1968. 474

LYONS J P, RYDER R, CAMPBELL H and GOUGH J: Pulmonary disability in coal workers' pneumoconiosis. Br Med J 1: 713-16, 1972. 475

McCALLUM R I: Respiratory disease in foundrymen. Br J Ind Med 29: 341-44, 1972. 476

[illegible] Respiratory function tests in older people.

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Source: https://www.industrydocuments.ucsf.edu/docs/nmk0000

MILNE J S and WILLIAMSON J: The relationship of respiratory function tests to respiratory symptoms and smoking in older people. Respiration 29: 206-13, 1972B. 478

MOLYNEUX M K B and TOMBLESON J B L: An epidemiological study of respiratory symptoms in Lancashire mills, 1963-66. Br J Ind Med 27: 225-34, 1970. 479

MULDOON B C and WARWICK M T: Lung function studies in asbestos workers. Br J Dis Chest 66: 121-32, 1972. 480

NORMAN-TAYLOR W and DICKINSON V A: Dangers for children in smoking families. Community Med 128: 32-33, 1972. 481

OLSEN H C and GILSON J C: Respiratory symptoms, bronchitis and ventilatory capacity in men. An Anglo-Danish comparison, with special reference to differences in smoking habits. Br Med J 1: 450-56, 1960. 482

OSWALD N C, HAROLD J T and MARTIN W J: Clinical pattern of chronic bronchitis. Lancet 2: 639-43, 1953. 483

OSWALD N C and MEDVEI V C: Chronic bronchitis. The effect of cigarette smoking. Lancet 2: 843-44, 1955. 484

REGAN G M, TAGG B, WALFORD J and THOMSON M L: The relative importance of clinical, radiological and pulmonary function variables in evaluating asbestosis and chronic obstructive airway disease in asbestos workers. Clin Sci 41: 509-582, 1971. 485

REID D D, ANDERSON D O, FERRIS B G and FLETCHER C M: An Anglo-American comparison of the prevalence of bronchitis. Br Med J 2: 1487-1491, 1964. 486

REID D D, CORNFIELD J, MARKUSH R E, SEIGEL D, PEDERSEN E and HAENSZEL W: Studies of disease among migrants and native population in Great Britain, Norway, and the United States. III. Prevalence of cardiorespiratory symptoms among migrants and native-born in the United States. In National Cancer Institute Monograph No. 19: 321-346, 1966. 487

RIMINGTON J: Chronic bronchitis, smoking and social class. A study among working people in the towns of Mid and East Cheshire. Br J Dis Chest 63: 193-205, 1969. 488

RYDER R, LYONS J P, CAMPBELL H and GOUGH J: Emphysema in coal workers' pneumoconiosis. Br Med J 3: 481-87, 1970. 489

WALKER D D, ARCHIBALD R M and ATTFIELD M D: Bronchitis in men employed in the coke industry. Br J Ind Med 28: 358-63, 1971. 490

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